

SUNY Poly's S-STEM Scholar Initiative

"Supporting Degree Completion in Engineering and Engineering Technology Programs through Experiential Learning and Self-Directed Professional Development"

~Cohort 2 Pre-Program Survey Results~

A Report To:



SUNY POLY

SUNY Poly

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Mullins Consulting

Inspired Social Research & Program Evaluation

Table of Contents

Introduction	1
Pre-Program Survey Results	1
Respondent Background Information	1
Support to Pursue STEM	2
Feelings Toward & Perceptions of Engineering.....	3
Confidence & Ideas About STEM Courses	6
Learning Style, Preferences, & Habits	10
Expectations of Faculty & Program Support	13
Academic & Career Goals	16
Summary & Conclusion	17

Introduction

This report details 2025 evaluation findings from the pre-test assessment of knowledge and skills for individuals entering Cohort 2 of SUNY Poly's National Science Foundation (NSF) S-STEM initiative titled *"Supporting Degree Completion in Engineering and Engineering Technology Programs through Experiential Learning and Self-Directed Professional Development."* The long-term goal of this program is to break down the barriers to degree completion within the programs of Civil Engineering, Civil Engineering Technology, Mechanical Engineering, and Mechanical Engineering Technology (CME&ET). In pursuit of this goal, SUNY Poly will provide a total of 65 one- year scholarships to 20 unique students in CME&ET. Scholars will include those who enter as first year students as well as transfer students.

The report below summarizes results from a pre-test survey distributed in September 2025 and used to assess incoming Scholar's support to pursue STEM-related activities, self-confidence, learning preferences and habits, feelings toward and ideas about engineering and STEM, expectations of faculty and the program, and future academic and career plans. These results will serve as a baseline measurement, providing a point of comparison for the evaluation of Scholar progression throughout their time in the program. All seven Scholars entering the program in Fall 2025 (Cohort 2) responded to the pre-test survey.¹ Results are presented both in aggregate and disaggregated by Scholar transfer status.

Pre-Program Survey Results

Respondent Background Information

As shown in the table below, Cohort 2 comprises equal parts transfer and non-transfer students. Most incoming Scholars (71%) report that they will be living in the on-campus dormitories during their first year at SUNY Poly, with only one indicating that they are a student athlete. When asked to report their parents' or guardians' highest level of education, all but one specify some college or higher.

Table 1: Respondent Background Information

Characteristic	n	%
Transfer Status		
<i>Transfer</i>	3	50.0
<i>Non-Transfer</i>	3	50.0
Living Situation		
<i>On-Campus</i>	5	71.4
<i>Commuter</i>	3	28.6
Student Athlete		
<i>No</i>	6	85.7
<i>Yes</i>	1	14.3
Parents'/Guardians' Educational Attainment		
<i>High School Diploma or Equivalent</i>	1	14.3
<i>Some College</i>	1	14.3
<i>Associate's Degree</i>	1	14.3
<i>Bachelor's Degree</i>	2	28.6
<i>Master's Degree</i>	1	14.3
<i>Unsure</i>	1	14.3

¹ Unless otherwise noted, the sample size for all analyses is 7 (n=7). Sample size differs throughout due to some item nonresponse.

Scholars were also asked whether they have attended any SUNY Poly-hosted events in the past two years. Over half of respondents report attending the SUNY Poly Open House, several attended Accepted Students Day, and a single respondent indicates that they attended an unlisted campus event (“College fairs”).

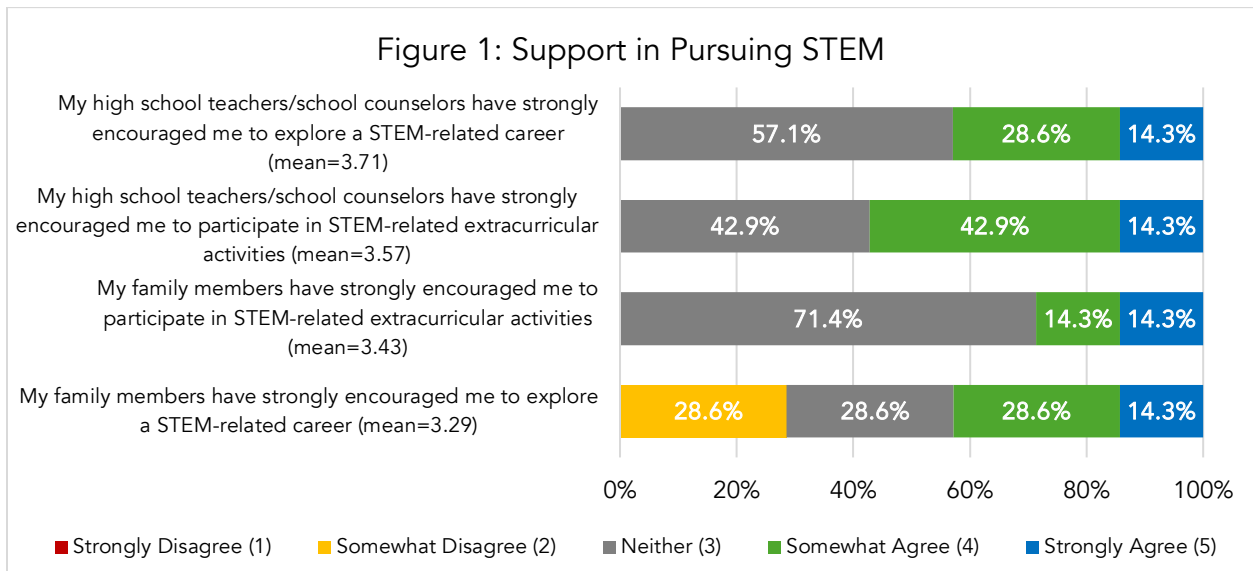
Table 2. SUNY Poly Events Attended in the Past Two Years

Event	n	%
SUNY Poly Open House	4	57.1
Accepted Student Day	2	28.6
Other Event	1	14.3
Know One Be One (KOBO) Event	--	--

Note. Respondents were asked to select all applicable options.

Support to Pursue STEM

Using a 5-point scale, Scholars were asked to rate their agreement with four statements regarding support they received to pursue STEM-related careers and extracurricular activities from family members and high school officials. While most (>55%) agree that high school officials encouraged them to pursue a STEM-related career, less than half report that family members encouraged such pursuits or that either group encouraged participation in STEM extracurricular activities.



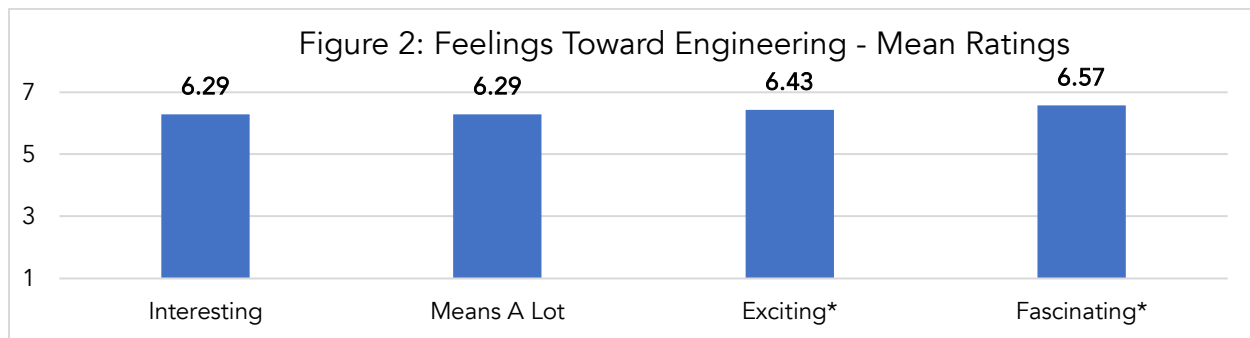
As shown in the table 3 (next page), no substantial differences are observed in mean responses to the aforementioned survey items based on Scholar transfer status.

Table 3. Group Differences on STEM Support Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
My family members have strongly encouraged me to participate in STEM-related extracurricular activities.	3.33	3.67
My family members have strongly encouraged me to explore a STEM-related career.	3.33	3.33
My high school teachers/counselors have strongly encouraged me to participate in STEM-related extracurricular activities.	3.67	4.00
My higher school teachers/counselors have strongly encouraged me to explore a STEM-related career.	3.67	3.67

Feelings Toward & Perceptions of Engineering

Next, Scholars were asked to rate their feelings toward the field of engineering on four semantic differential scales ranging from one (less favorable sentiment) to seven (more favorable sentiment). On average, respondents provide ratings nearing the scale maximum (7) for all feelings probed, with Scholars providing the highest rating of engineering as a *fascinating* (mean=6.57) subject.



*Items were reverse coded prior to analysis.

Again, disaggregated results show that transfer and non-transfer Scholars provide largely similar ratings of their feelings toward the field of engineering.

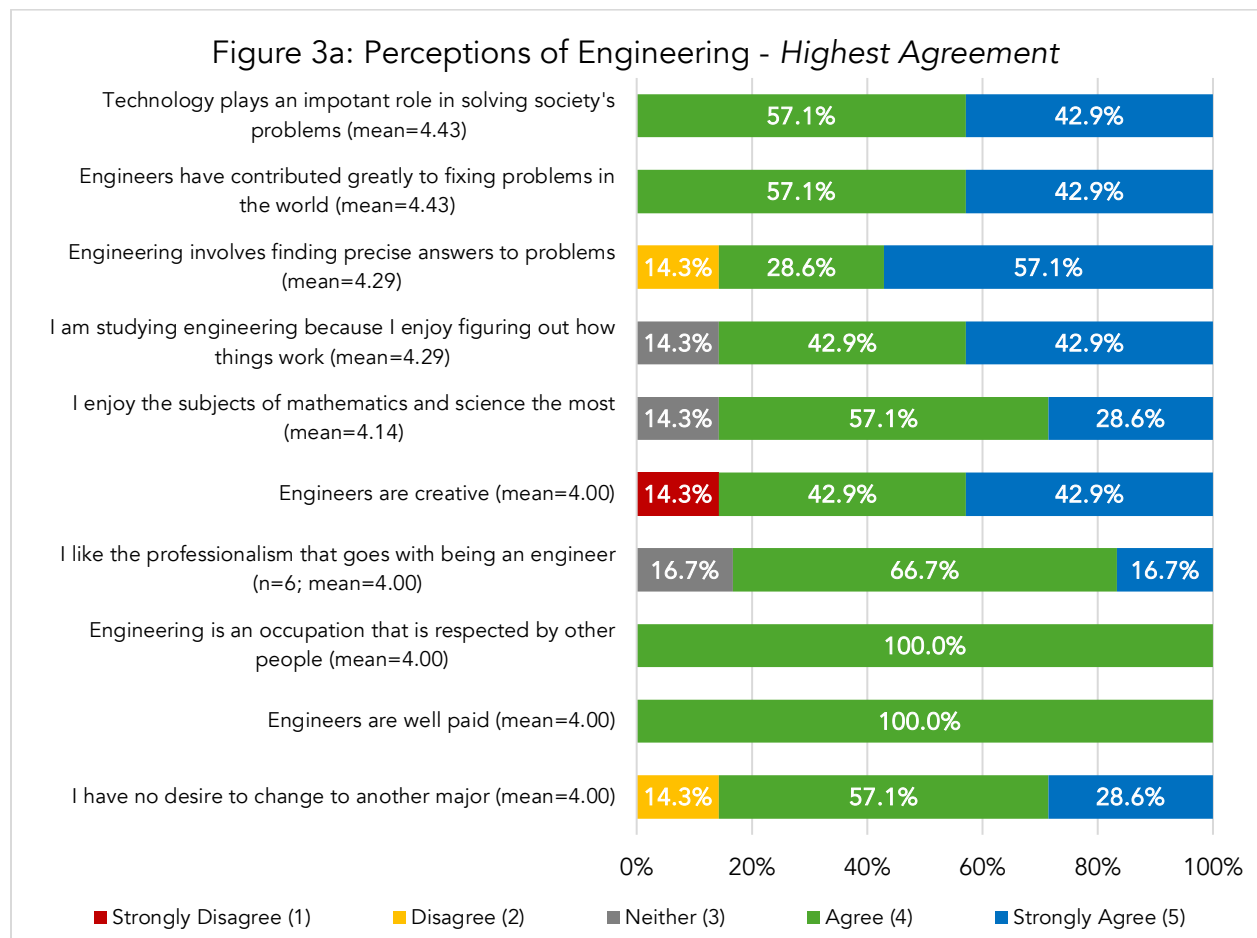
Table 4. Group Differences on Engineering Feelings Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
Fascinating	6.67	7.00
Means A Lot	6.33	6.67
Exciting	6.67	6.67
Interesting	6.67	6.33

Next, respondents were asked to rate their agreement with 18 statements measuring their perceptions of engineering more broadly.² Generally, responses to this portion of the questionnaire suggest that Scholars have a highly positive view of engineering as a major, career choice, and vocation, with respondents tending to agree with statements favorable of the field and disagree or express neutrality with negatively worded statements.

As shown in Figure 3a, all Scholars agree to some extent that:

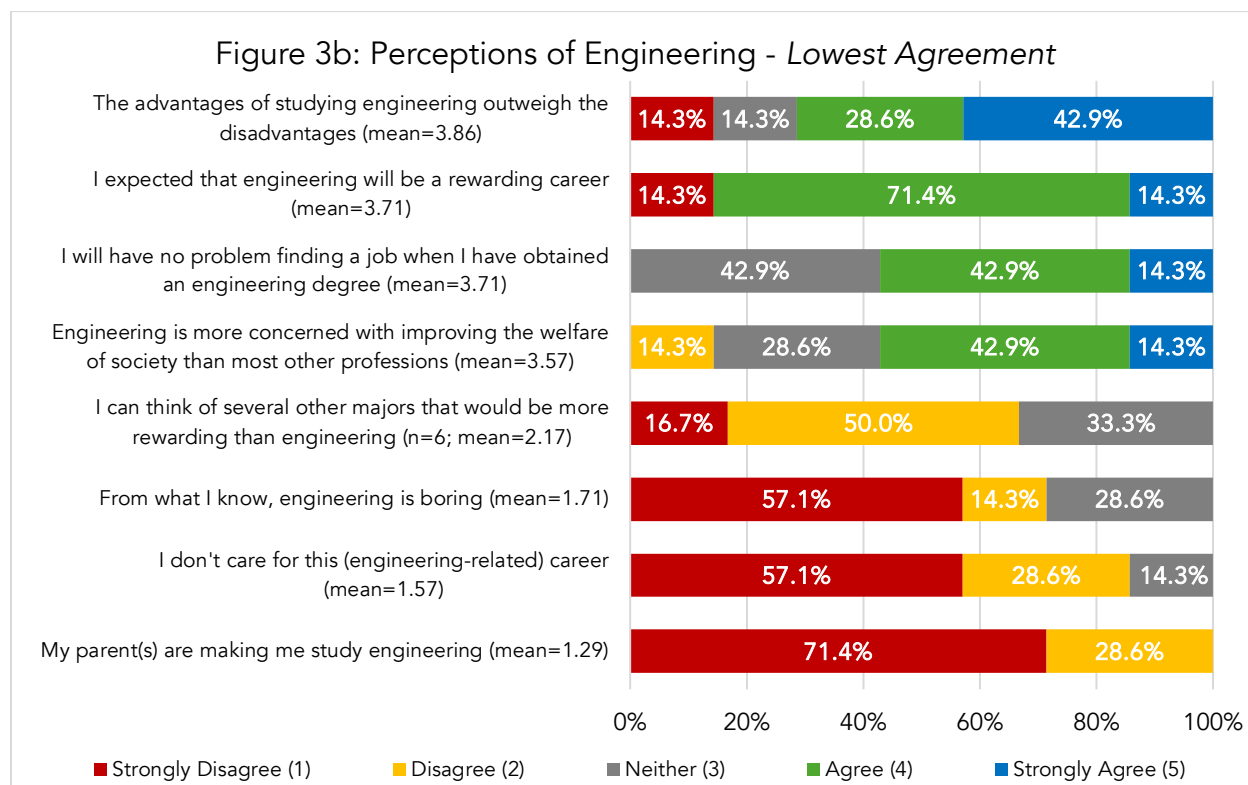
- Technology plays an important role in solve societal problems (mean=4.43),
- Engineers have contributed greatly to fixing societal problems (mean=4.43),
- Engineering is an occupation that is respected by others (mean=4.00), and that
- Engineers are paid well (mean=4.00).



² These items were adapted from the Pittsburgh Freshman Engineering Attitudes Survey.

In contrast, Figure 3b shows that Scholars average the lowest level of agreement when asked whether:

- They can think of other majors that would be more rewarding than engineering (mean=2.17),
- From what they know, engineering is boring (mean=1.71),
- They do not care for a career in engineering (mean=1.57), and whether
- Their parents are making them study engineering (mean=1.29).



As shown in Table 5 (next page), transfer and non-transfer Scholars average considerably different responses (i.e., greater than half a scale point) to several items measuring perceptions toward engineering.³ Most notably, transfer students are *more likely* to agree that they enjoy science and math and that their parents are making them study engineering, and are *less likely* to agree that:

- They expect engineering will be a rewarding career,
- The advantages of studying engineering will outweigh the disadvantages,
- They will have no problem finding a job in the field once they have obtained a degree,
- Engineers are creative, and that
- Engineering involves finding precise answers to questions.

³ Mean differences of larger than half a scale point are bolded in the tabled results.

Table 5. Group Differences on Engineering Perceptions Measures

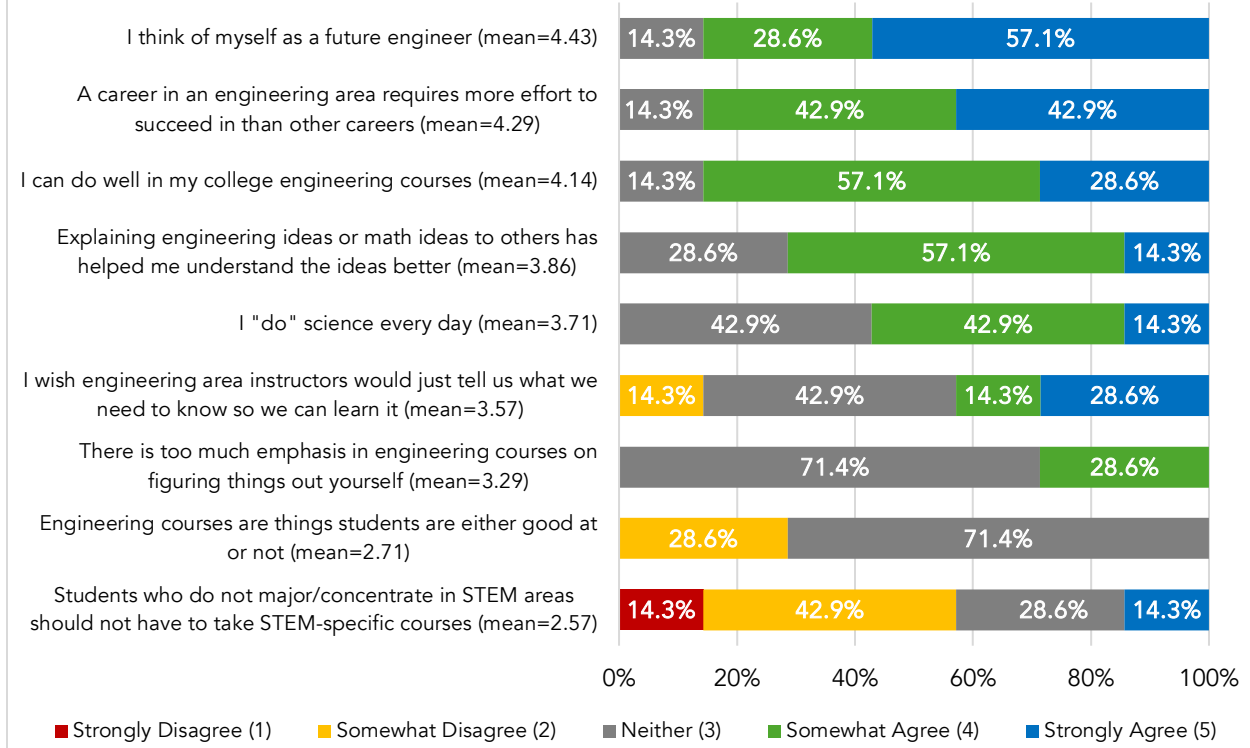
	Means	
	Transfer (n=3)	Non-Transfer (n=3)
I expect that engineering will be a rewarding career.	3.33	4.00
The advantages of studying engineering outweigh the disadvantages.	3.33	4.33
I don't care for this (engineering-related) career.	1.33	1.33
I can think of several other majors that would be more rewarding than engineering.	2.00	2.33
I have no desire to change to another major (ex. biology, English, chemistry, art, history, etc.)	4.33	4.33
From what I know, engineering is boring.	1.33	1.67
Engineers are well paid.	4.00	4.00
I enjoy the subjects of mathematics and science the most.	4.67	4.00
I will have no problem finding a job when I have obtained an engineering degree.	3.33	4.00
My parent(s) are making me study engineering.	1.67	1.00
Engineering is an occupation that is respected by other people.	4.00	4.00
I like the professionalism that goes with being an engineer.	4.00	4.50 (n=2)
Engineering is more concerned with improving the welfare of society than most other professions.	3.67	3.33
Engineers have contributed greatly to fixing problems in the world.	4.33	4.67
Engineers are creative.	3.33	4.67
Engineering involves finding precise answers to problems.	4.00	4.67
I am studying engineering because I enjoy figuring out how things work.	4.33	4.33
Technology plays an important role in solving society's problems.	4.33	4.67

Confidence & Ideas About STEM Courses

Scholars were next asked to rate their agreement with a series of statements regarding their ideas about STEM and engineering-related courses, and their ability to succeed both in certain academic areas and as scholarship recipients more broadly.

Regarding Scholars' ideas about STEM and engineering-related courses, most (>55%) either "Somewhat" or "Strongly" agree that: they think of themselves as a future engineer; an engineering-related career requires more effort to succeed than other careers; they can do well in their college engineering courses; explaining engineering or math ideas to others has helped them to better understand such ideas; and that they "do" science every day. However, most express either neutrality or disagreement with the remaining statements. Notably, over half disagree to some extent that students who do not major in STEM should not be required to take related courses (see Figure 4, next page).

Figure 4: Ideas About STEM & Engineering-Related Courses



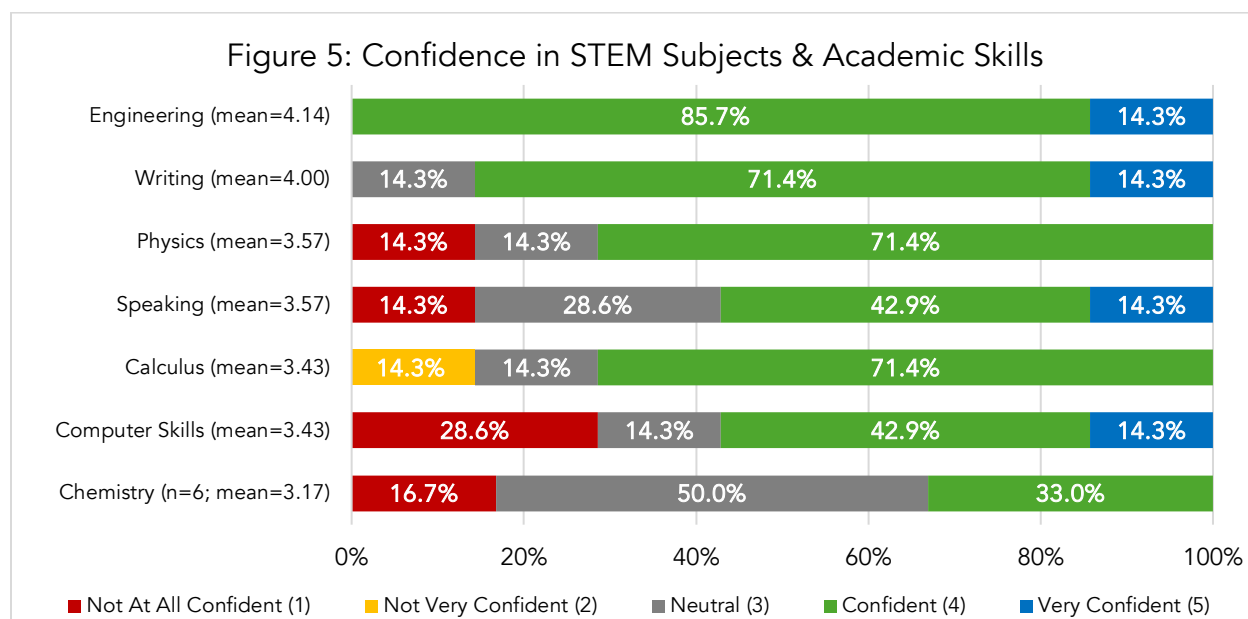
Compared to their non-transfer counterparts, transfer Scholars are considerably *less likely* to agree that:

- They wish engineering instructors would just tell students what they need to know,
- They can do well in their college engineering courses,
- A career in engineering requires more effort to succeed, and that
- They think of themselves as a future engineer.

Table 6. Group Differences on Ideas Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
Students who do not major/concentrate in STEM areas should not have to take STEM-specific courses.	2.33	2.00
I wish engineering area instructors would just tell us what we need to know so we can learn it.	3.00	3.67
I "do" science every day.	3.67	4.00
There is too much emphasis in engineering courses on figuring things out for yourself.	3.33	3.33
I can do well in my college engineering courses.	4.00	4.67
A career in an engineering area requires more effort to succeed in than other careers.	3.67	4.67
Engineering courses are things students are either good at or not.	2.67	2.67
Explaining engineering ideas or math ideas to others has helped me understand the ideas better.	3.67	4.00
I think of myself as a future engineer.	4.33	5.00

Scholars were also asked to rate their confidence in seven subjects and skill areas using a 5-point scale. On average, Scholars are *most confident* in their engineering (mean=4.14) and writing abilities (mean=4.00) and *least confident* in their chemistry skills (mean=3.17).



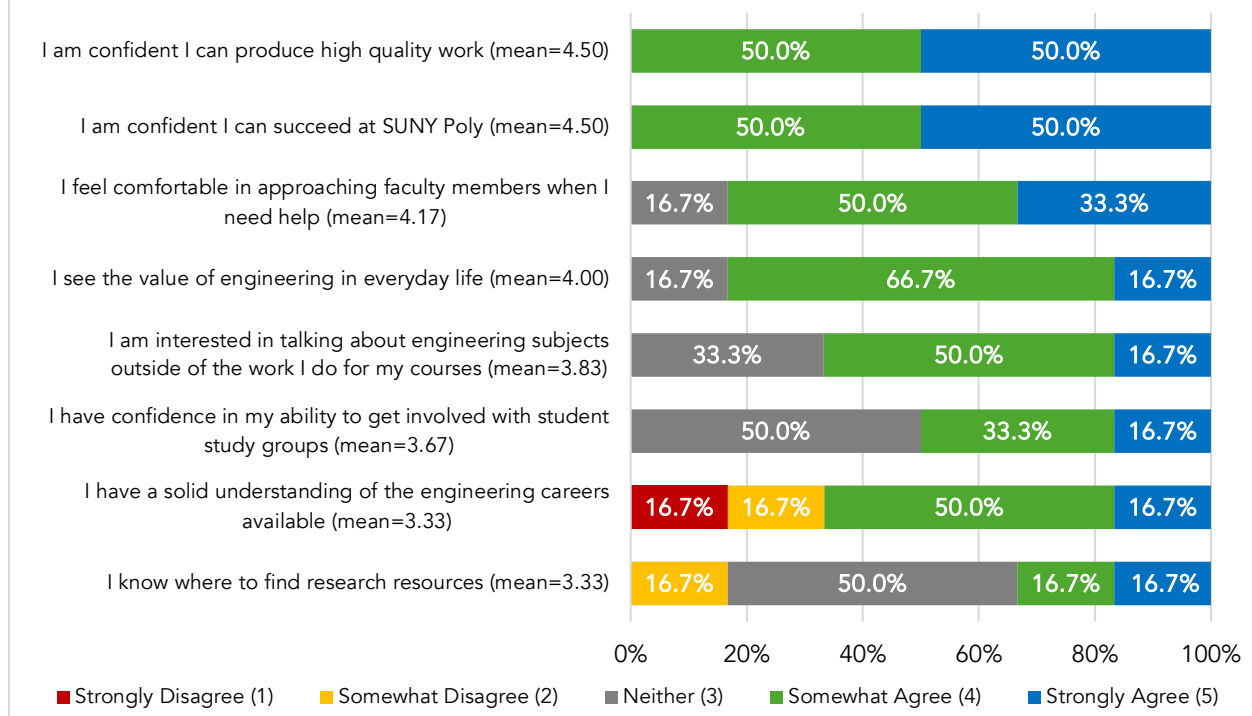
Disaggregated results show that, compared to non-transfers, transfer students provide substantially *higher ratings* of their proficiency in physics and provide *lower ratings* of their speaking and computer skills.

Table 7. Group Differences on Confidence in Subjects/Skills Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
Chemistry	3.33	3.00
Physics	4.00	3.33
Calculus	3.67	4.00
Engineering	4.00	4.33
Writing	4.00	4.00
Speaking	3.00	4.00
Computer Skills	3.33	4.00

Additionally, respondents express a high level of confidence in their abilities as S-STEM Scholars, with all agreeing that they are confident they can produce high quality work and succeed at SUNY Poly (see Figure 6, next page). Most (>80%) also agree that they: feel comfortable approaching faculty for help; see the value of engineering in everyday life; are interested in discussing engineering subjects outside of their courses; and have a solid understanding of available engineering careers. However, half or more express uncertainty or disagreement when asked whether they are confident they can become involved in student study groups and know where to find research resources.

Figure 6: Confidence at SUNY Poly (n=6)



Disaggregated results suggest that transfer students have a lower level of confidence as incoming SUNY Poly students, with these Scholars considerably *less likely* to agree that they:

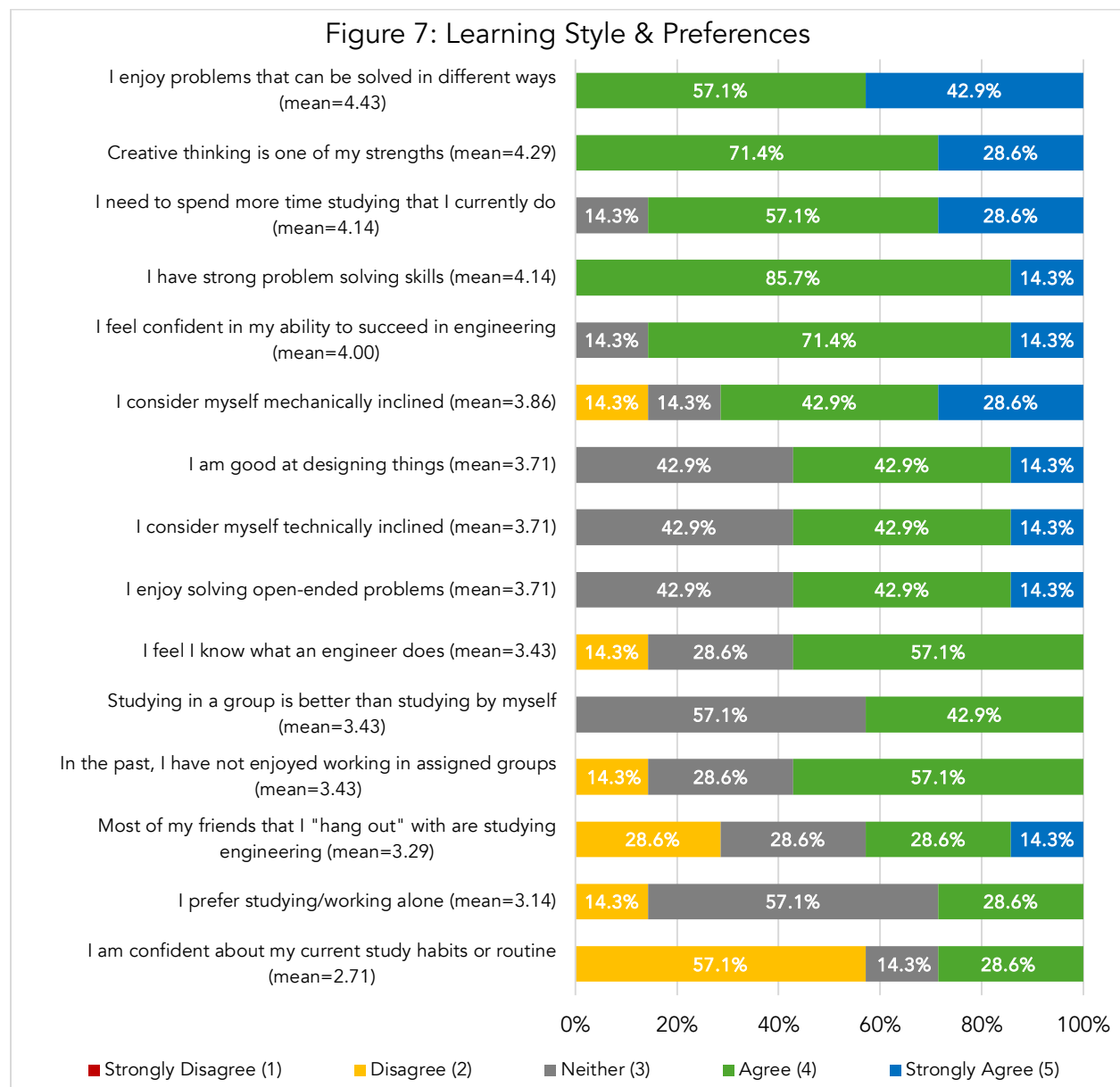
- Are interested in discussing engineering subjects outside of their coursework,
- Are confident they can produce high quality work,
- Have confidence in their ability to become involved in student study groups, and
- Are confident they can succeed at SUNY Poly.

Table 8. Group Differences on Confidence at SUNY Poly Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=2)
I am interested in talking about engineering subjects outside of the work I do for my courses.	3.67	4.50
I know where to find research resources.	3.33	3.50
I am confident I can produce high quality work.	4.00	5.00
I feel comfortable in approaching faculty members when I need help.	4.00	4.50
I have confidence in my ability to get involved with student study groups.	3.33	4.50
I am confident I can succeed at SUNY Poly.	4.33	5.00
I have a solid understanding of the engineering careers available.	4.00	3.50
I see the value of the engineering field in everyday life.	4.00	4.50

Learning Style, Preferences, & Habits

Scholars were next asked to rate their agreement with 15 statements describing learning styles, preferences, and habits. Generally, responses demonstrate that most Scholars enjoy creative problem-solving and interactive learning environments, though feel that their current study habits need improvement. On average, respondents are *most likely* to agree that: they enjoy open-ended problems (mean=4.43); creative thinking is one of their strengths (mean=4.29); they have strong problem-solving skills (mean=4.14); and that they need to spend more time studying than they currently do (mean=4.14). On the other hand, respondents are *least likely* to agree that: most of their friends are studying engineering (mean=3.29); they prefer studying or working alone (mean=3.14); and that they are confident in their current study routine (mean=2.71).



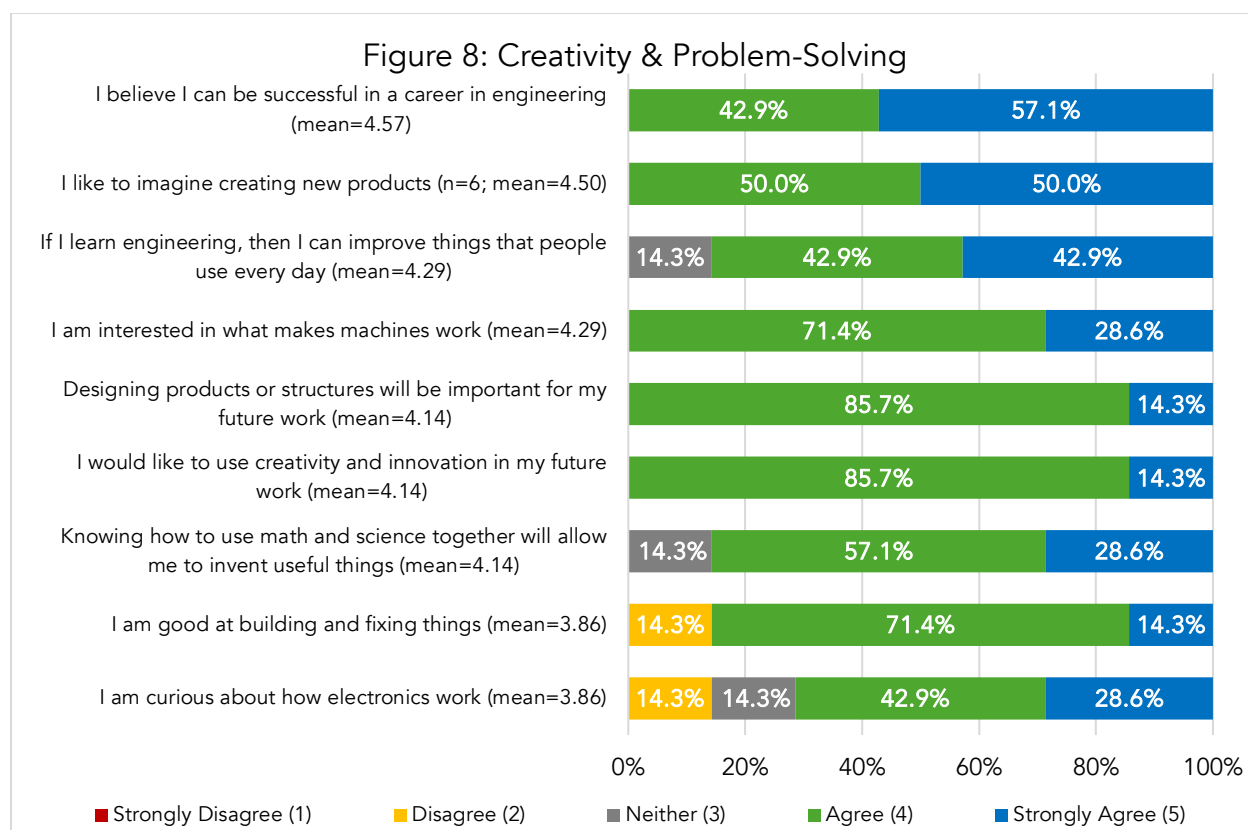
As shown below, compared to their non-transfer counterparts, transfer Scholars are considerably *more likely* to agree that they consider themselves mechanically inclined and have not enjoyed working in assigned groups in the past, and are *less likely* to agree that:

- Creative thinking is one of their strengths,
- Most of their friends are studying engineering, and that
- They are good at designing things.

Table 9. Group Differences on Learning Style Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
I feel I know what an engineer does.	3.67	3.67
Studying in a group is better than studying by myself.	3.33	3.33
Creative thinking is one of my strengths.	4.00	4.67
I need to spend more time studying than I currently do.	4.00	4.33
I have strong problem solving skills.	4.00	4.33
Most of my friends that I "hang out" with are studying engineering.	3.00	4.00
I feel confident in my ability to succeed in engineering.	4.00	4.33
I prefer studying/working alone.	3.33	3.33
I am good at designing things.	3.33	4.00
In the past, I have not enjoyed working in assigned groups.	4.00	3.00
I am confident about my current study habits or routine.	3.00	2.67
I consider myself mechanically inclined.	4.33	3.33
I consider myself technically inclined.	3.67	4.00
I enjoy solving open-ended problems.	3.67	4.00
I enjoy problems that can be solved in different ways.	4.33	4.67

Further, all or most (>70%) Scholars express agreement when presented with nine statements regarding creativity, innovation, and problem-solving (see Figure 8, next page). For instance, all respondents agree that they would like to use creativity and innovation in their future work and that engineering provides a path to improving things that people use every day, and nearly all agree that they are good at building and fixing things.



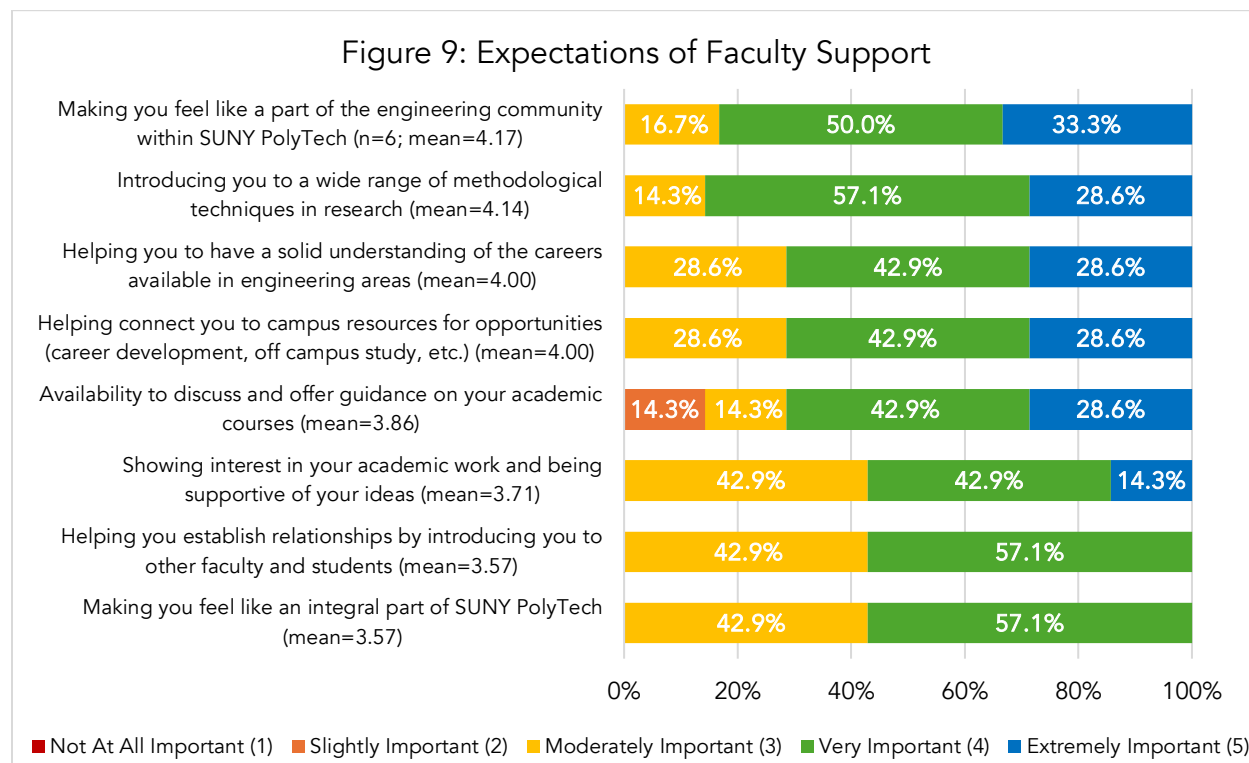
The table below shows that, compared to non-transfers, transfer Scholars are considerably *less likely* to agree with most of the aforementioned survey items, with disparities exceeding one scale point observed for the statements “If I learn engineering, then I can improve things that people use every day” and “I am curious about how electronics work.”

Table 10. Group Differences on Creativity & Problem-Solving Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
I like to imagine creating new products.	4.00	5.00 (n=2)
If I learn engineering, then I can improve things that people use every day.	3.67	5.00
I am good at building and fixing things.	3.33	4.33
I am interested in what makes machines work.	4.00	4.67
Designing products or structures will be important for my future work.	4.00	4.33
I am curious about how electronics work.	3.00	4.67
I would like to use creativity and innovation in my future work.	4.00	4.33
Knowing how to use math and science together will allow me to invent useful things.	4.33	4.33
I believe I can be successful in a career in engineering.	4.33	5.00

Expectations of Faculty & Program Support

When presented with eight items regarding expectations of faculty engagement, all or nearly all respondents find it at least “Moderately” important that faculty provide each type of support listed. On average, Scholars feel it is *most important* that faculty make them feel like a part of the engineering community at SUNY Poly (mean=4.17) and introduce them to a range of methodological techniques (mean=4.14), and indicate it is *least important* that faculty help them establish relationships with other faculty and students and make them feel like an integral part of the broader campus community (means=3.57).



As shown in Table 11 (next page), transfer Scholars place considerably *greater importance* on faculty members' availability to offer academic guidance and *less importance* on introductions to new methodological techniques compared to their non-transfer counterparts.

Table 11. Group Differences on Faculty Support Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
Availability to discuss and offer guidance on your academic courses.	4.33	3.67
Helping you to have a solid understanding of the careers available in engineering areas.	4.33	4.00
Introducing you to a range of methodological techniques in research.	4.00	4.67
Showing interest in your academic work and being supportive of your ideas.	4.00	3.67

Table 11. Group Differences on Faculty Support Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
Helping you establish relationships by introducing you to other faculty and students.	3.67	3.67
Helping connect you to campus resources for opportunities (career development, off campus study, etc.).	4.33	4.00
Making you feel like a part of the engineering community within SUNY PolyTech.	4.33	4.00
Making you feel like an integral part of SUNY PolyTech.	4.00	4.33

Relatedly, most (>80%) Scholars feel it is either “Very” or “Extremely” important that the program provide six additional supports. Average responses indicate that these Scholars feel it is *most important* that the program provide professional development opportunities (mean=4.43), occasions to interact with industry partners (mean=4.29), and help expressing engineering-related concepts through hands-on learning experiences (mean=4.14).

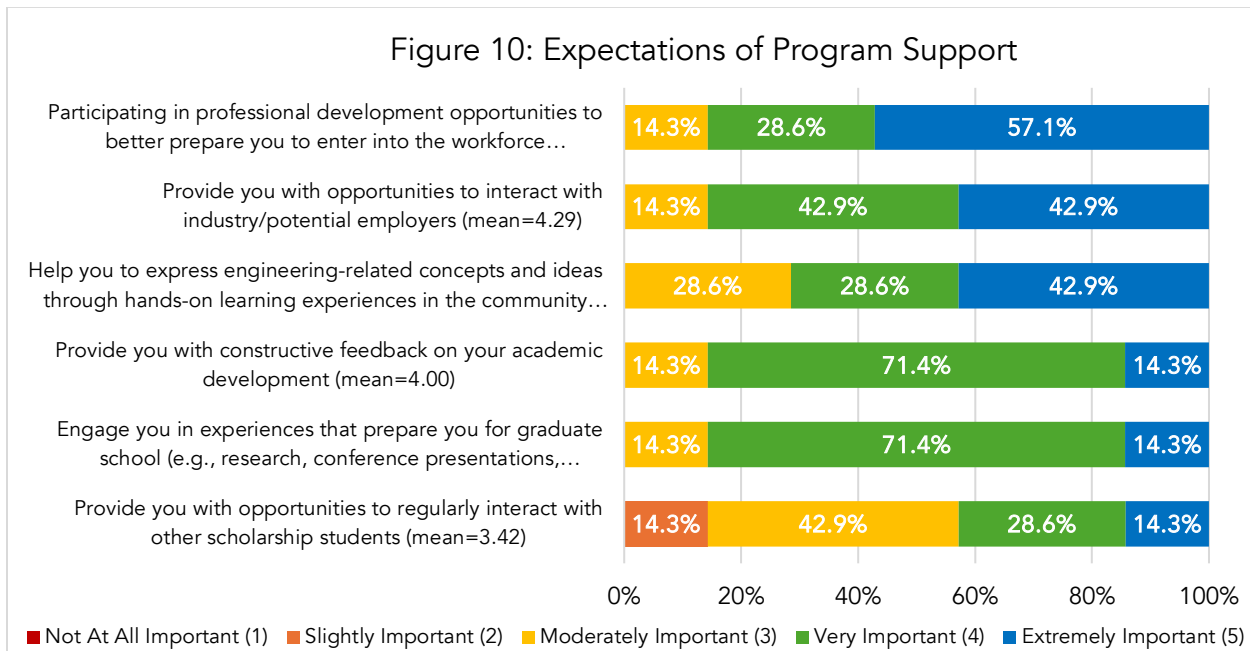
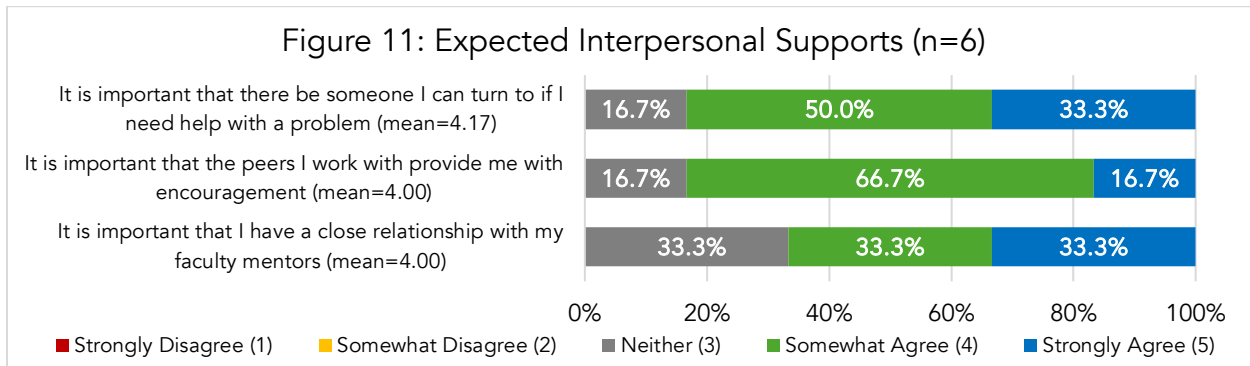


Table 12 (next page) shows that transfer Scholars place *less importance* on all forms of program support, with this group providing substantially lower ratings regarding their expectations of help expressing engineering-related concepts through hands-on learning and opportunities for professional development, professional networking, and peer interaction.

Table 12. Group Differences on Program Support Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=3)
Help you to express engineering-related concepts and ideas through hands-on learning experiences in the community.	3.67	5.00
Provide you with constructive feedback on your academic development.	4.00	4.33
Provide you with opportunities to interact with industry/potential employers.	3.67	5.00
Provide you with opportunities to regularly interact with other scholarship students.	3.33	4.00
Engage you in experiences that prepare you for graduate school (e.g., research, conference presentations, publications).	4.00	4.33
Participating in professional development opportunities to better prepare you to enter into the workforce (internships, job shadowing).	4.33	5.00

Survey results also demonstrate that Scholars expect interpersonal support during their time in the program, with most respondents (>65%) agreeing it is important that: there be someone they can turn to if they need help with a problem; their peers provide them with encouragement; and they have a close relationship with their faculty mentors.



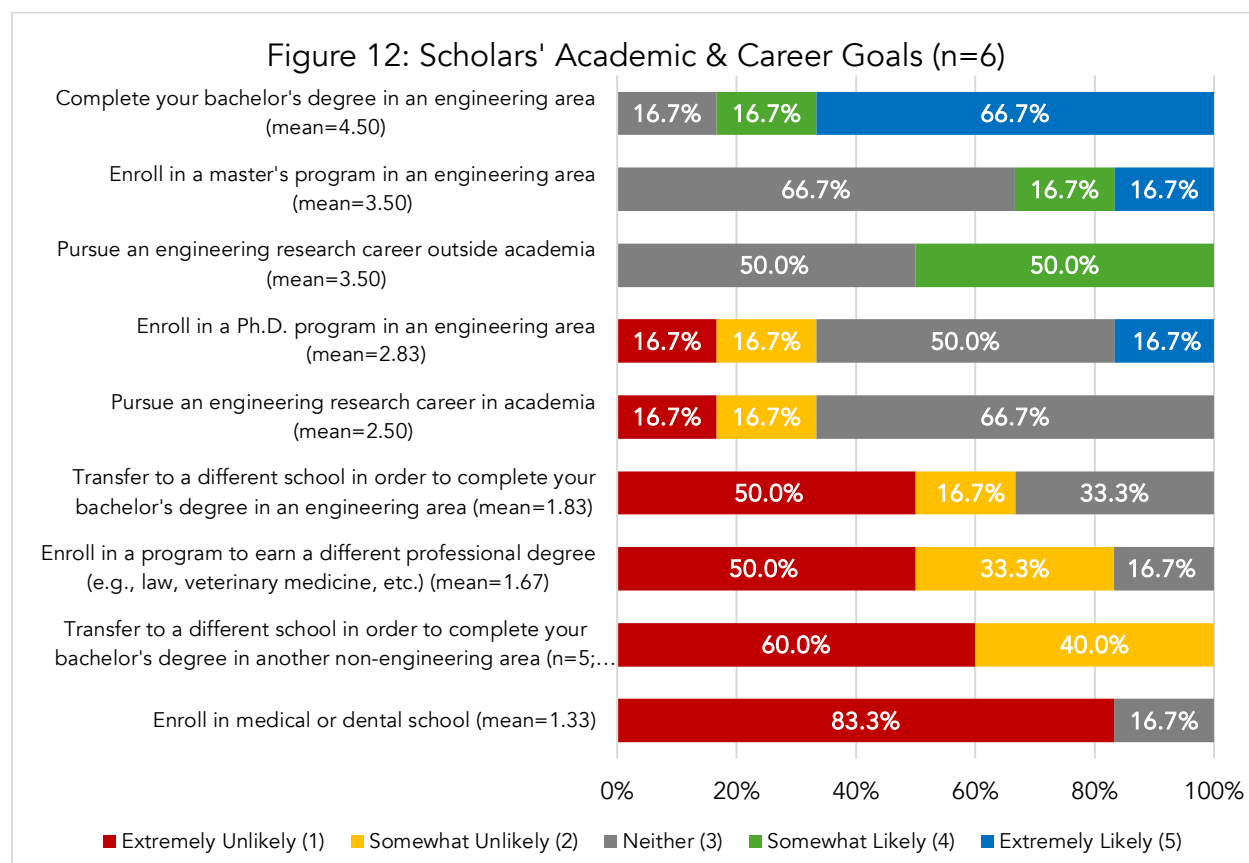
Compared to non-transfers, transfer Scholars are considerably *less likely* to agree that it is important that there be someone they can turn to if they need help with a problem.

Table 13. Group Differences on Program Support Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=2)
It is important that there be someone I can turn to if I need help with a problem.	3.67	4.50
It is important that the peers I work with provide me encouragement.	4.00	3.50
It is important that I have a close relationship with my faculty mentors.	3.67	4.00

Academic & Career Goals

Scholars were then asked how likely it is that they will pursue nine possible academic and professional goals using a scale from “Extremely Unlikely” (1) to “Extremely Likely” (5). Most respondents (83%) indicate it is “Somewhat” or “Extremely” likely that they will complete their bachelor’s degree in an engineering area and half report the same likelihood that they will pursue an engineering research career outside academia. In contrast, half or more indicate that they are uncertain whether they will pursue a master’s or Ph.D. in engineering or seek an engineering research career in academia, and most Scholars (<65%) report that they are unlikely to pursue a professional degree (e.g., medical, law, etc.) or transfer to a different institution to complete their bachelor’s degree in either an engineering or non-engineering area.



Among the goals listed, disaggregated results show that transfer Scholars are considerably *less likely* to enroll in either a master’s or Ph.D. program following bachelor’s degree completion.

Table 14. Group Differences on Learning Style Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=2)
Transfer to a different school in order to complete your bachelor's degree in an engineering area	1.33	2.00
Transfer to a different school in order to complete your bachelor's degree in another non-engineering area	1.33	1.50

Table 14. Group Differences on Learning Style Measures

	Means	
	Transfer (n=3)	Non-Transfer (n=2)
Complete your bachelor's degree in an engineering area	4.67	5.00
Enroll in a master's program in an engineering area	3.00	4.50
Enroll in a Ph.D. program in an engineering area	2.33	3.50
Enroll in medical or dental school	1.00	1.00
Enroll in a program to earn a different professional degree (i.e., law, veterinary medicine, etc.)	1.33	1.50
Pursue an engineering research career in academia	2.33	2.50
Pursue an engineering research career outside academia	3.33	3.50

Finally, when asked to describe one thing SUNY Poly can do to help them succeed during their first year in the program, three Scholars underscore the need for close academic and professional guidance during the early stages of their program experience.

All Comments:

"Improve professors' methods and ways of teaching the course material to make it easier to learn."

"Teach me the different fields of engineering and how to get into them."

"Tell me by teaching me what careers are available to me, so I am actually working towards a goal besides graduating."

Summary & Conclusion

This report serves as a baseline understanding of incoming Cohort 2 Scholar's attitudes toward engineering; confidence to succeed; learning preferences and habits; ideas about STEM and engineering courses; expectations of faculty and the program; and future academic and career plans. This data is both informative of the Scholars' expectations and perceptions upon entering the program and useful as a reference point for future evaluations of the cohort as they progress through the S-STEM Scholar experience at SUNY Poly.

Survey results demonstrate that Cohort 2 Scholars come from backgrounds moderately supportive of STEM pursuits, with respondents having received more encouragement to pursue STEM-related careers and extracurriculars from high school officials than family members. These Scholars tend to see themselves as future engineers and have highly favorable feelings toward the field, with nearly all respondents viewing engineering as a creative enterprise, a means of addressing societal problems, and a rewarding career option. All respondents are confident in their ability to produce high quality work and succeed as S-STEM Scholars at SUNY Poly, and most are confident in their ability to engage with peers and faculty during their first year in the program. However, responses also indicate that many Scholars are not confident in their speaking, chemistry, and computer skills and that most are unsure of available career options in engineering and how to access research resources and become involved in student study groups.

Results also show that most respondents prefer interactive learning environments and enjoy creative problem-solving, though many feel that their current study routine could use improvement. Additionally, these Scholars have high expectations that the program will facilitate their academic success and help prepare them for workforce entry by providing regular opportunities for professional development, industry networking, and hands-on community learning, with responses further indicating that participants expect close guidance and mentorship from faculty members during their time in the program. In their open-ended comments, several Scholars reiterate the need for ongoing academic and professional support during their initial year in the program and, given that most respondents are likely to complete their bachelor's degree in a STEM area and expect to subsequently pursue a non-academic engineering research career, it is important that faculty and staff facilitate Scholars' goals by meeting these expectations of program support. Further, because Scholars place a high level of importance on integrating into the engineering department at SUNY Poly and receiving interpersonal support from their peers and mentors, facilitating community connections early in the program may be integral to the success of this cohort.

Disaggregated results generally show lower mean ratings across most survey items among Scholars who are transferring from another institution. Most notably, compared to their non-transfer counterparts, transfer Scholars hold less positive perceptions toward engineering as a profession; are less confident in their speaking and computer skills; are less confident in their ability to succeed at SUNY Poly; are less likely to agree with statements reflective of creative learning styles; place less importance on receiving program and interpersonal support as S-STEM Scholars; and are less likely to pursue many of the academic and professional goals listed in the questionnaire. Although these disparities were gleaned from a considerably small number of responses, such differences may nonetheless warrant ongoing consideration from program organizers to ensure a consistent experience for Scholars from diverse academic backgrounds.

Overall, findings from the pre-test survey suggest that Cohort 2 Scholars are excited to start engaging with engineering at the university level. They come to SUNY with a favorable view of engineering and a high degree of confidence in their academic abilities. They look forward to entering an active learning environment where they can engage with their faculty and peers, receive close academic guidance and hands-on learning opportunities, and become a part of the engineering and campus communities at SUNY Poly. Still, results suggest that Scholars transferring to SUNY Poly from outside institutions are entering the program with lower levels of confidence, preparedness, and excitement to pursue engineering compared to their non-transfer counterparts. Given these findings, it is recommended that the program encourages incoming Cohort 2 Scholars to establish close relationships with faculty and peers and provides early opportunities for research and professional development, and that organizers continue to monitor and address differences in perceptions, skills, and professional prospects among students from different backgrounds to ensure that all Scholars receive a consistent and rewarding program experience.